UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

THE EXISTENCE OF CHAOS IN AIR POLLUTION INDEX (API) BY USING LARGEST LYAPUNOV EXPONENT METHOD

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IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL.

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ABSTRACT

This research presents a study on the existence of chaotic behavior, a property of non-linear situation, in the time series data of Air Pollution Index (API). A chaotic indicator namely Largest Lyapunov Exponential (LLE) method is used in this research, to examine if there any existence of chaotic behavior in API time series data. The result shows that there is the presence of chaotic behavior in the API time series data when λ, a symbol of LLE, is greater than 0 in all states: Johor, Negeri Sembilan, Pahang and Perak. Then, in order to help the predictors, this research also predict the number of time series data that free from chaotic behavior. The reason is, to make a prediction, the data itself need to be free from chaotic behavior in order to avoid from obtaining inaccurate prediction data. In conclusion, this research proof that API time series data had the chaotic behavior and each state have different period of time series data that free from chaotic behavior.